

BANGLADESH



A Low-Cost Ambulance Network to Improve Access to Maternity Services in Dhaka, Bangladesh

WHAT IS FISTULA?

Obstetric fistula is a childbirth injury, usually occurring when a woman is in labor too long or when delivery is obstructed, and she has no access to a cesarean section. She endures internal injuries that leave her incontinent, trickling urine and sometimes feces through her vagina.

Fistula Care works to prevent fistula from occurring, treats and cares for women with fistula, and assists in their rehabilitation and reintegration. For more information about fistula and the Fistula Care project, visit www.fistulacare.org.

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Introduction

The high cost and lack of availability of transportation can pose significant barriers to laboring women in need of skilled care around the world. In densely populated urban environments, transportation problems remain acute, despite the ubiquity of vehicles. In Dhaka, the humming capital of Bangladesh, 11.9 million people jostle for space (BBS, 2011). Women in labor can opt to travel by rickshaw or three-wheeled minivan during the day, which can be effective, although slow and uncomfortable. At night, however, drivers may refuse to transport laboring women because of security concerns. Hiring a private ambulance or car has historically proven prohibitively expensive for many.

In 2008, the Ad-din Hospital recognized that many women in Dhaka were failing to access emergency obstetric care and established a low-cost ambulance service. Using mobile phones and global positioning system (GPS) tracking, Ad-din manages a fleet of 66 ambulances stationed throughout the city. These ambulances serve women requiring transport for emergency obstetric care, as well as for nonemergency services such as transport home after discharge. Transportation to skilled maternity care provides women with the services they need to prevent obstetric fistula, which occurs when a woman is in labor too long or the delivery is obstructed and she has no access to a cesarean delivery.

Ad-din Hospital

Ad-din Hospital in Dhaka is one of the charitable projects of the Ad-din Foundation, dedicated to serving the health needs of women and children. Created by the founder of the business conglomerate Akij Group, Ad-din is one of four private hospitals that receive U.S. Agency for International Development (USAID) support through EngenderHealth's Fistula Care project in Bangladesh to prevent and surgically repair obstetric fistula. For example, Fistula Care provides equipment and supplies and supports training on emergency obstetric care, infection prevention, and family planning methods and counseling. Ad-din Hospital's fistula treatment work is just one piece of its broad portfolio for maternal health. The hospital admits more than 14,000 gynecology and obstetrics patients annually. Most are thought to be middle-income or lower-middle-income patients.

Design of Ambulance Network

In January 2008, the Ad-din Hospital purchased a fleet of 10 ambulances. Within a year, the fleet had grown to 46 vehicles, and interest in the new program increased quickly. In 2011, another 20 vehicles were added to the fleet.

The fleet is managed by an ambulance desk near the entrance of Ad-din Hospital, where a dispatcher asks callers for their name, location, contact number, and the patient's name. The dispatcher does not discuss the patient's health issue, as the ambulance

service is available to all. Rather, the dispatcher determines which driver is closest and available, then puts the driver and requesting party in touch with one another so they can confirm how soon the ambulance will arrive and exactly how to locate the patient's address.

Patients can choose to be driven to any facility in Dhaka, unless they very urgently require care, in which case the driver takes them to the nearest appropriate facility. In June 2011, the price for any trip within Dhaka increased from 160 taka (\$2.16) to 260 taka (\$3.51), because of rising fuel costs. In contrast, other existing ambulance services charge 2,000 taka (\$27.03) or more. The ambulance fees that Ad-din collects cover fuel costs, while driver salaries and maintenance costs are and will continue to be fully subsidized by hospital income. Information about the ambulance service spreads primarily through the advertisements printed on the ambulances themselves, as well as through a recurring radio advertisement for which Ad-din Hospital pays.

Every ambulance user is accompanied by at least one attendant, usually a relative, with no more than five accompanying people. The cost of any ambulance trip within Dhaka is the same, regardless of the number of passengers. Between 10% and 15% of Ad-din ambulance users come from outside Dhaka. For trips outside the city, Ad-din charges 20 taka (\$0.27) per km rather than the flat rate.

Ad-din waives ambulance charges for the 30% of incoming patients who are deemed unable to pay. Ambulance transport is free to all fistula patients, both before and after repair. Some patients pay a subsidized fare (less than 260 taka), but data are not available on their number. Ad-din has developed partnerships with nongovernmental organizations that pay for the transport of very poor patients (fewer than 2% of ambulance users). The level of subsidization means that the ambulance network is clearly a charitable endeavor of the Ad-din Hospital, which embraces its role in increasing patients' access to affordable transportation.

The Ambulance Fleet

Each of Ad-din's 66 ambulances is just 1.4 m wide and 3.4 m long (4 feet, 7 inches by 11 feet, 2 inches). Each ambulance is equipped with a stretcher, an oxygen tank, a mask, and two small fans. The compact design means that ambulances can navigate nearly any Dhaka road and weave more effectively through the congested traffic than larger vehicles might. When not in use, ambulances typically park at 18 locations throughout the city, and six to eight ambulances are generally based at Ad-din Hospital.

GPS Technology for Efficient Dispatching

To ensure efficiency and quality, each ambulance in the Ad-din network is equipped with a GPS tracking device, which allows dispatchers to quickly determine which driver can reach a given patient with greatest ease and speed. This rapid response is especially important for women who are experiencing obstetric complications and need emergency care.

Ad-din's vehicle tracking system is offered by Grameenphone, a leading telecommunications operator in Bangladesh, which couples its data network with devices and software developed by nexSecure. That technology is most typically used to prevent or address car theft, but the principle of GPS-based vehicle tracking can be applied to a fleet of vehicles for 690 taka (\$9.32) per car per month. The vehicle tracking system informs Ad-din of the real-time location, speed, and direction of every ambulance via a web site.

Ambulance dispatchers can easily generate a list of vehicles by distance to the caller for any given location, and those who prefer to visualize vehicle location use Grameenphone data to generate a Google Map. Ad-din requires dispatchers to have high levels of computer skills, in addition to the short orientation Grameenphone holds for ambulance desk staff to introduce them to the software and its options. The ambulance fleet manager holds a master's degree in information technology.

Because the system maintains the registration and license numbers for each vehicle, it can be used to supervise drivers, identifying which vehicles are moving and which are parked, as well as where each vehicle has traveled over the past two months. The ambulance desk manager receives a text message whenever an ambulance travels at speeds over 80 km per hour (50 mph). Ad-din has not yet opted to utilize all of the system's sophisticated reporting options, such as expense monitoring and graphs that analyze a vehicle's speed or distance traveled over the course of a day, but these features could reduce Ad-din's reliance on registers and log books in the future.

Staffing

To operate its fleet of 46 vehicles, Ad-din maintains a staff of 52 drivers and five ambulance desk dispatchers. Additional drivers are being recruited to operate the 20 ambulances that were added to the fleet in 2011.

Drivers work 12-hour shifts, six days per week. Ten drivers serve on night duty at any given time. When a new driver is hired, he trains for 15 days, learning Ad-din's expectations regarding behavior toward patients, careful driving, procedures, rates, and first aid. Hospital staff members orient drivers to the location of various wards, so that they can accompany patients, as needed, when they arrive at Ad-din.

All Ad-din drivers and dispatchers are male, while patients are typically female. Ad-din management reports that this has not posed challenges, as female patients usually are accompanied to a health facility by a male relative, and the drivers are carefully selected and trained. In addition to the initial training, drivers receive monthly one-hour refresher trainings from a senior consultant, nurse, or ambulance desk staff member on various health topics, including safe birth practices and fistula prevention.

The ambulance desk maintains registers to document income, expenses, and driver attendance, as well as a log of maintenance costs, a receipt book, and a daily summary of trips by driver. To

Table 1. Ad-din ambulance use, by category

Ad-din ambulance trips		2009	%	2010	%	Total	%
Incoming patients	Ad-din—obstetrics and gynecology	2,990	8%	2,994	5%	5,984	6%
	Ad-din—other services	412	1%	295	1%	707	1%
	Taken directly to another hospital	10,370	27%	14,804	27%	25,174	27%
Discharged/transferred patients	Ad-din—obstetrics and gynecology	22,848	60%	34,565	62%	57,413	61%
	Ad-din—other services	1,572	4%	3,074	6%	4,646	5%
Total		38,192	100%	55,732	100%	93,924	100%

increase use, Ad-din service providers share leaflets and talk with antenatal care patients and community members about the ambulance service. Likewise, ambulance drivers distribute brochures about fistula treatment and communicate about Ad-din Hospital's other services through their interactions with the public.

Use of Ambulance Services

Uptake of Ad-din's ambulance service since 2008 has been rapid. Although ambulance services are typically designed to assist patients in reaching emergency care, the service also provides an important transport option for patients needing to return home from the hospital; 62% of Ad-din ambulance trips in 2010 were to return discharged obstetric patients to their homes (Table 1). In the same year, 82% of incoming patients using Ad-din's ambulances chose to be delivered to a hospital other than Ad-din.

During 2009 and 2010, most of Ad-din's incoming patients who arrived by ambulance (89%) were obstetrics and gynecology cases—typically women who were in labor or were experiencing pregnancy complications. These ambulance users constituted 21% of Ad-din's obstetrics and gynecology admissions in both years. (Ad-din admitted 14,448 obstetrics and

gynecology patients and delivered 9,017 babies in 2010.)

Additional data on ambulance use could be available through the vehicle tracking software, but such data would focus largely on trip characteristics, such as users' home neighborhoods and drivers' typical assignments. In the absence of population-based data, one cannot draw definitive conclusions about the effect of improved transport on maternal health outcomes.

Keys to Success

A number of factors have enabled the success of Ad-din's ambulance network. These include the following characteristics of Ad-din management:

- Commitment to and vision for the ambulance network
- Ability and willingness to subsidize significantly the costs of running the service
- Ability to exploit available technologies, especially the GPS-based vehicle tracking system, to ensure efficiency

- Expectations for the integrity of all staff
- Willingness for the ambulance network to serve all patients and all facilities within the city of Dhaka, not just Ad-din Hospital
- Assurance of safety and predictability for ambulance users, even at night

Challenges

Dhaka's notorious traffic congestion poses the primary challenge to Ad-din's ambulance network. At night, an ambulance's average trip length is 20 minutes, but the average trip is two hours or more during the day. Typically, drivers complete just five or six trips over the course of a 12-hour shift.

In addition, demand for ambulance services peaks at midday. Although the ambulance service is primarily intended for incoming patients, many discharged patients are eager to use the low-cost, comfortable ambulances to return home. Ad-din prioritizes incoming patients, particularly those with emergency conditions, and discharged patients may use ambulances on a first-come, first-served basis. Nevertheless, in early 2011, roughly once per week the demand for ambulances for incoming patients became so high that callers had to be informed that a vehicle was not available and that they should find an alternative means of transport or, if possible, wait. The growth of the ambulance fleet in June 2011 should help to mitigate this issue.



The ambulance desk at Ad-din Hospital, where dispatchers field calls and assign ambulances

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The People's Republic of Bangladesh is one of the most densely populated countries in the world, with a population of more than 142 million (BBS, 2011). Bangladesh's population growth has slowed in recent decades because of the availability and uptake of family planning services. Despite widespread poverty, the maternal mortality ratio in Bangladesh has dropped by 40% in the past 10 years, from 322 per 100,000 to 194 per 100,000 (Streatfield et al., 2011).

Fistula Care at EngenderHealth
440 Ninth Avenue, 13th Floor
New York, NY 10001
Tel: 212-561-8000

www.fistulacare.org



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Ad-din faces management challenges to maintaining its team of drivers. Although 25 of the 52 ambulance network staff have been with the program since its start, staff turnover is generally high. Many drivers have been dismissed for using vehicles for unauthorized purposes (such as private transport and driving lessons) or for overcharging patients and pocketing the extra money. Ad-din management must frequently give warnings, charge fines, and dismiss the worst offenders. To reward good performance, Ad-din instituted a periodic "best driver award" and annual incremental salary increases. Newly hired drivers are required to meet an educational requirement, but some long-serving drivers have low literacy skills. This poses a challenge to introducing a system in which drivers would issue receipts themselves.

Lastly, the ambulance network has suffered from the limited communication and rivalries that sometimes exist between hospitals. While the Ad-din ambulance network provides transport to any health facility of a patient's choosing, there is little reciprocation from other hospitals, some of which receive commissions when they refer clients to other ambulance services.

Conclusions

The Ad-din ambulance network exemplifies the use of newly available technology and tools to improve women's access to skilled care. Dhaka's daytime traffic often renders impossible any rapid transport of laboring women to health facilities. Improvements in road infrastructure or reductions in traffic volume would help patients to access services with greater speed.

Although 21% of admitted obstetrics and gynecology patients now arrive by ambulance, the majority of ambulance passengers are discharged patients, who also appreciate the low cost and comfort of lying down during their transport. Ad-din must continue to balance the sometimes competing demands of discharged and incoming patients. Ad-din's 2011 expansion of its fleet will allow discharged patients to continue to travel by ambulance without compromising the availability of ambulances for emergency patients.

The fact that the overwhelming majority of clients who use ambulances to reach Ad-din Hospital are obstetrics and gynecology patients confirms that Ad-din's service is indeed benefiting those it was designed to serve. Ad-din continues to grow and strengthen the ambulance program so that prompt access to health care is increasingly available to all, including women at risk of developing obstetric fistula.

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